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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,707	12/02/2003	Igor A. Krichtafovitch	432.008/10101579	2218
7590 06/24/2005			EXAMINER	
Michael J. Strauss Fulbright & Jaworski L.L.P. 801 Pennsylvania Avenue, N.W. Washington, DC 20004			QUASH, ANTHONY G	
			ART UNIT	PAPER NUMBER
			2881	

DATE MAILED: 06/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/724,707

Applicant(s)

KRICHTAFOVITCH ET AL.

Examiner

Anthony Quash

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/2/03 (application filed).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date see rejection.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Specification

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 2/11/04 and 12/01/04 has been considered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,4 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakakibara [JP 60-114363]. As per claim 1, Sakakibara [JP 60-114363] discloses a method of operating a corona discharge device comprising the steps of: producing a high-intensity electric field (inherent since the corona discharge produces an electric field) in an immediate vicinity of a corona electrode and heating at least a portion of the corona electrode to a temperature sufficient to mitigate an undesirable effect of an

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impurity formed on said corona electrode. In addition, Sakakibara [JP 60-114363] discloses step of producing a high intensity electric field includes applying a voltage to said corona electrode (inherent, since the corona discharge produces an electric field) sufficient to cause a corona discharge from said corona electrode. See Sakakibara [JP 60-114363] abstract, figs. 1-10.

Claims 1,4 are rejected under 35 U.S.C. 102(b) as being anticipated by Noguchi [4,689,056]. As per claim 1, Noguchi [4,689,056] discloses a method of operating a corona discharge device comprising the steps of: producing a high-intensity electric field (abstract, figs.1-10) in an immediate vicinity of a corona electrode (col. 1 lines 35-65, col. 4 lines 20-25, col. 6 lines 25-35, col. 6 lines 50-68) and heating (col. 5 line 58 – col.6 line 5, col. 8 lines 35-55) at least a portion of the corona electrode to a temperature sufficient to mitigate an undesirable effect of an impurity formed on said corona electrode (col. 5 line 58 – col.6 line 5, col. 8 lines 35-55). In addition, Noguchi [4,689,056] discloses step of producing a high intensity electric field includes applying a voltage to said corona electrode (col. 1 lines 35-65, col. 2 lines 1-7) sufficient to cause a corona discharge from said corona electrode. Also see Noguchi [4,689,056] abstract, figs. 1-10, col. 1 lines 35-65, col. 2 lines 1-15, col. 4 lines 10-25, col. 5 lines 15-25, 45-68, col. 6 lines 1-65, col. 7 lines 35-60, and col. 8 lines 25-68.

Claims 1,4-7,10,13,15-17,22,25-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Morita [6,039,816]. As per claims 1,4, Morita [6,039,816] discloses a method of operating a corona discharge device comprising the steps of: producing a high-intensity electric field (inherent, since the corona discharge produces an electric

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field) in an immediate vicinity of a corona electrode and heating (abstract) at least a portion of the corona electrode to a temperature sufficient to mitigate an undesirable effect of an impurity formed on said corona electrode. In addition Morita [6,039,816] discloses step of producing a high intensity electric field includes applying a voltage to said corona electrode (inherent, since the corona discharge produces an electric field) sufficient to cause a corona discharge from said corona electrode. Also see Morita [6,039,816] abstract, col. 2 lines 10-32, 50-67, col. 3 lines 1-5,14-25,50-55, col. 4 lines 10-15,20-30,35-48,50-67, col. 5 lines 1-30,45-55, col. 6 lines 1-5, col. 7 lines 40-45, col. 8 lines 1-5,35-40,55-67, col. 9 line 62 – col.10 line 40, col. 13 lines 35-45, col. 15 lines 20-45, and col. 16 lines 35-50.

As per claim 5, Morita [6,039,816] discloses the step of heating is performed continuously. See Morita [6,039,816] col. 10 lines 30-40.

As per claim 6, Morita [6,039,816] discloses steps of producing a high intensity electric field and heating are performed simultaneously. See Morita [6,039,816] col. 5 lines 45-52, col. 10 lines 30-40, and col. 16 lines 25-35. Also see Morita [6,039,816] abstract, col. 2 lines 10-32, 50-67, col. 3 lines 1-5,14-25,50-55, col. 4 lines 10-15,20-30,35-48,50-67, col. 5 lines 1-30,45-55, col. 6 lines 1-5, col. 7 lines 40-45, col. 8 lines 1-5,35-40,55-67, col. 9 line 62 – col.10 line 40, col. 13 lines 35-45, col. 15 lines 20-45, and col. 16 lines 35-50.

As per claim 7, Morita [6,039,816] discloses the step of heating being performed periodically. See Morita [6,039,816] col. 4 line 35 – col. 5 line 15. Also see Morita [6,039,816] abstract, col. 2 lines 10-32, 50-67, col. 3 lines 1-5,14-25,50-55, col. 4 lines

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10-15,20-30,35-48,50-67, col. 5 lines 1-30,45-55, col. 6 lines 1-5, col. 7 lines 40-45, col. 8 lines 1-5,35-40,55-67, col. 9 line 62 – col.10 line 40, col. 13 lines 35-45, col. 15 lines 20-45, and col. 16 lines 35-50.

As per claim 10, Morita [6,039,816] discloses the step of periodically heating includes a step of monitoring a characteristic of said corona electrode and, in response, heating said portion of said corona electrode. See Morita [6,039,816] col. 5 lines 1-15, col. 7 lines 40-45, col. 10 line 60 - col. 10 line 2, and col. 16 lines 29-46.

As per claims 13,15-17, Morita [6,039,816] discloses the steps of terminating a heating of said corona electrode in response to detecting a predetermined electrical characteristic of said corona electrode, measuring a period of time since a last heating cycle and, in response to a lapse of a predetermined time period, heating said portion of said corona electrode, measuring a time period of a current heating cycle and, in response to expiration of a predetermined period of time, terminating the current heating cycle, and the steps of terminating said step of producing prior to initiating said step of periodically heating and, upon completion of said step of periodically heating, reinitiating said step of producing said high-intensity electric field. See Morita [6,039,816] abstract, col. 2 lines 10-32, 50-67, col. 3 lines 1-5,14-25,50-55, col. 4 lines 10-15,20-30,35-48,50-67, col. 5 lines 1-30,45-55, col. 6 lines 1-5, col. 7 lines 40-45, col. 8 lines 1-5,35-40,55-67, col. 9 line 62 – col.10 line 40, col. 13 lines 35-45, col. 15 lines 20-45, and col. 16 lines 35-50.

As per claim 22, Morita [6,039,816] discloses a corona discharge device comprising a high voltage power supply connected to corona electrodes generating a

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high intensity electric field (inherent, since the corona discharge produces an electric field); a low voltage power supply connected to said corona electrodes for resistively heating said corona electrodes; and a control circuitry for selectively connecting said high voltage power supply and low voltage power supply to said corona electrodes.

See Morita [6,039,816] col. 13 lines 35-45. Also see Morita [6,039,816] abstract, col. 2 lines 10-32, 50-67, col. 3 lines 1-5,14-25,50-55, col. 4 lines 10-15,20-30,35-48,50-67, col. 5 lines 1-30,45-55, col. 6 lines 1-5, col. 7 lines 40-45, col. 8 lines 1-5,35-40,55-67, col. 9 line 62 – col.10 line 40, col. 13 lines 35-45, col. 15 lines 20-45, and col. 16 lines 35-50.

As per claim 25, Morita [6,039,816] discloses a timer (col. 4 line 64 -col. 5 lines – 55), the control circuitry responsive to said timer for periodically applying said low voltage to said corona electrodes. See Morita [6,039,816] col. 8 lines 1-5, col. 13 lines 35-45. Also see Morita [6,039,816] abstract, col. 2 lines 10-32, 50-67, col. 3 lines 1-5,14-25,50-55, col. 4 lines 10-15,20-30,35-48,50-67, col. 5 lines 1-30,45-55, col. 6 lines 1-5, col. 7 lines 40-45, col. 8 lines 1-5,35-40,55-67, col. 9 line 62 – col.10 line 40, col. 13 lines 35-45, col. 15 lines 20-45, and col. 16 lines 35-50.

As per claim 26, Morita [6,039,816] discloses control circuitry comprises a switch. See Morita [6,039,816] col. 10 lines 15-20.

As per claim 27, Morita [6,039,816] discloses measurement circuitry configured to provide an indication of a condition of said corona electrodes, said control circuitry responsive to said indication for applying said low voltage to said corona electrodes.

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See Morita [6,039,816] col. 5 lines 1-30, col. 9 line 60 – col. 10 line 5, col. 13 lines 35-40.

As per claim 28, Morita [6,039,816] discloses the measurement circuitry indicates an electrical resistance of said corona electrodes. See Morita [6,039,816] col. 15 lines 30-40, 50-60, and col. 16 lines 1-35.

As per claims 29-30, Morita [6,039,816] discloses low voltage power supply is configured to supply a controlled magnitude of electric power to said corona electrodes, the low voltage power supply being configured to periodically accumulate and discharge a controlled amount of electromagnetic energy to said corona electrodes. See Morita [6,039,816] col. 13 lines 35-45. Also see Morita [6,039,816] abstract, col. 2 lines 10-32, 50-67, col. 3 lines 1-5, 14-25, 50-55, col. 4 lines 10-15, 20-30, 35-48, 50-67, col. 5 lines 1-30, 45-55, col. 6 lines 1-5, col. 7 lines 40-45, col. 8 lines 1-5, 35-40, 55-67, col. 9 line 62 – col. 10 line 40, col. 13 lines 35-45, col. 15 lines 20-45, and col. 16 lines 1-50.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakibara [JP 60-114363] in view of Yu [5,469,242]. As per claim 2, Sakakibara [JP 60-114363] teaches all aspects of the claim except for explicitly stating that the portion

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of the corona electrode comprises a metal or alloy including a metal selected from the group consisting of silver, lead, zinc and cadmium. Yu [5,469,242] does teach the corona electrode comprises a metal or alloy including a metal selected from the group consisting of silver, lead, zinc and cadmium. See Yu [5,469,242] abstract, figs. 1-3, col. 3 line 64 – col. 4 line 5. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the corona electrode be comprise of a metal or alloy including a metal selected from the group consisting of silver, lead, zinc and cadmium in order to reduce the adsorption of nitrogen oxides as taught in Yu [5,469,242].

Claims 2-3,8,11-12,14,22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita [6,039,816]. As per claims 2,22, Morita [6,039,816] teaches all aspects of the claim except for explicitly stating corona electrode comprises a metal or alloy including a metal selected from the group consisting of silver, lead, zinc and cadmium. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the corona electrode comprise a metal or alloy including a metal selected from the group consisting of silver, lead, zinc and cadmium, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claims 3,23, Morita [6,039,816] teaches corona electrode is heated to attain a temperature T given by the equation $T > \Delta H_{rxn} / \Delta S_{rxn}$ where ΔH_{rxn} is the standard state enthalpy (ΔH_{0rxn}) and ΔS_{rxn} is the standard state entropy changes for the

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oxidation process of a surface material of said corona electrode. See Morita

[6,039,816] abstract, col. 4 lines 45-65, col. 16 lines 29-45.

As per claim 8, Morita [6,039,816] teaches all aspects of the claim except for explicitly stating the step of producing a high intensity electric field and heating not overlapping. It would have been obvious to one of ordinary skill in the art at the time the invention was made to prevent the steps of producing a high intensity electric field and heat from overlapping in order to prevent overheating and reduce deterioration of the electrode.

As per claim 9, Morita [6,039,816] teaches all aspects of the claim except for explicitly stating the portion of the corona electrode comprises a material that oxidizes under the influence of air and/or the alloy containing such a material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the portion of the corona electrode comprise a material that oxidizes under the influence of air and/or the alloy containing such a material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claims 11-12,14, Morita [6,039,816] teaches all aspects of the claim except for explicitly stating the characteristic being electrical resistivity or conductivity of the corona electrode or a portion of that electrode. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to monitor electrical resistivity or conductivity of the corona electrode since it was known that the accumulation of impurities on the electrode increases the resistivity and decreases the

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conductivity of the electrode. Therefore by monitoring the resistivity and conductivity of the corona, one would be able to determine when it is necessary to clean the electrode.

Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita [6,039,816]. As per claim 18, Morita [6,039,816] teaches a method of operating a corona discharge device comprising the steps of: producing a high-intensity electric field in an immediate vicinity of a corona electrode (inherent, since the corona discharge produces an electric field); detecting a condition indicative of initiation of a corona electrode cleaning cycle, interrupting application of a high voltage to at least a portion of said corona electrodes so as to terminate said step of producing said high-intensity electric field with regard to that portion of corona electrodes; applying a heating current to said portion of said corona electrodes sufficient to raise a temperature thereof resulting in at least partial elimination of an impurity formed on said portion of said corona electrodes, and reapplying said high voltage to said portion of said corona electrodes so as to continue producing said high-intensity electric field with regard to that portion of corona electrodes. See Morita [6,039,816] abstract, col. 2 lines 10-32, 50-67, col. 3 lines 1-5, 14-25, 50-55, col. 4 lines 10-15, 20-30, 35-48, 50-67, col. 5 lines 1-30, 45-55, col. 6 lines 1-5, col. 7 lines 40-45, col. 8 lines 1-5, 35-40, 55-67, col. 9 line 62 – col. 10 line 40, col. 13 lines 35-45, col. 15 lines 20-45, and col. 16 lines 35-50.

However, Morita [6,039,816] does not explicitly teach a plurality of corona electrodes.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a plurality of corona electrodes, since it has been held that

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mere duplication of the essential working parts of a device involves only routine skill in the art.

As per claim 19, Morita [6,039,816] teaches all aspects of the claim except for explicitly stating the plurality of corona electrodes being divided into a plurality of portions and said step of applying the heating current is repeated with respect to each of said portions. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the plurality of corona electrodes divided into a plurality of portions, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. With respect to the applicants' claim concerning step of applying the heating current being repeated with respect to each of said portions, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the heating current to each of the portions in order to clean them of debris/impurities/contaminants.

As per claim 20, Morita [6,039,816] teaches all aspects of the claim except for explicitly stating repeated application of said heating current to each of said portions of said corona electrodes being completed for all of said plurality of corona electrodes prior to said step of reapplying said high voltage to any of said portions of said corona electrodes. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the repeated application of the heating current to each of said portions of said corona electrodes be completed for all of said plurality of corona electrodes prior to said step of reapplying said high voltage to any of said portions of

said corona electrodes in order to completely clean all the electrodes thereby allowing maximum output when the high voltage is reapplied.

As per claim 21, Morita [6,039,816] teaches all aspects of the claim except for explicitly stating the steps of interrupting application of a high voltage, applying the heating current, and reapplying said high voltage are performed serially for each of the portions of corona electrodes so that said high voltage is interrupted, and the heating current is applied, to a single portion of said corona electrodes at any one time, the other portions continuing to have said high-voltage applied thereto. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the steps of interrupting application of a high voltage, applying said heating current, and reapplying said high voltage be performed serially for each of said portions of corona electrodes so that said high voltage is interrupted, and said heating current is applied, to a single portion of said corona electrodes at any one time, the other portions continuing to have said high-voltage applied thereto in order to clean the electrodes while simultaneously still producing ozone.

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morita [6,039,816] in view of Krichtafovitch [6,504,308]. As per claim 31, Morita [6,039,816] teaches all aspects of the claim except for explicitly stating the low voltage power supply comprises a fly-back power converter. Krichtafovitch [6,504,308] does teach the low voltage power supply comprises a fly-back power converter. See Krichtafovitch [6,504,308] col. 10 lines 30-45. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the low voltage power

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supply comprises a fly-back power converter in order ensure silent operation as taught in Krichtafovitch [6,504,308].

Claim 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita [6,039,816] in view of Rodden [6,270,733]. As per claims 32-33, Morita [6,039,816] teaches a corona discharge comprising the steps of: generating a high intensity electric field (inherent, since the corona discharge produces an electric field) in a vicinity of a corona electrode, converting a portion of an initial corona electrode material of said corona electrode using a chemical reaction that decreases generation of a corona discharge by-product; and heating the corona electrode. See Morita [6,039,816] abstract, col. 2 lines 10-32, 50-67, col. 3 lines 1-5, 14-25, 50-55, col. 4 lines 10-15, 20-30, 35-48, 50-67, col. 5 lines 1-30, 45-55, col. 6 lines 1-5, col. 7 lines 40-45, col. 8 lines 1-5, 35-40, 55-67, col. 9 line 62 – col. 10 line 40, col. 13 lines 35-45, col. 15 lines 20-45, and col. 16 lines 35-50. However, Morita [6,039,816] does not explicitly state heat the corona electrode to a temperature sufficient to substantially restore the converted part of the corona electrode material back to the initial corona electrode material. Rodden [6,270,733] teaches heating an electrode which suppresses the production of ozone (by product) and that the heating of the ozone further reduces the ozone back to oxygen. See Rodden [6,270,733] col. 1 lines 20-35. Therefore, this process would revert the mixture of a metal and an oxide by metal in and oxygen separately. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to heat the corona electrode to a temperature sufficient to substantially restore the converted part of the corona electrode material

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back to the initial corona electrode material in order to prolong the life expectance of the corona electrode.

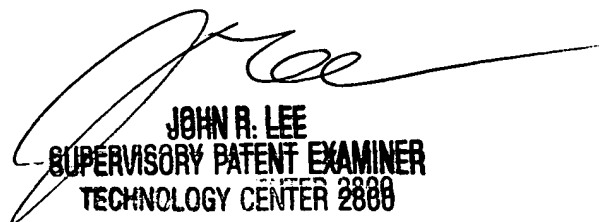
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (571)-272-2480. The examiner can normally be reached on Monday thru Friday 9 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571)-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A. Quash
AQ
6/15/05


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